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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/817,821	03/26/2001	Keith Hall	SMX 3071.1 (99-22R1)	7846
45735	7590	11/02/2006	EXAMINER	
SENNIGER POWERS (SMX)			TRAN, MY CHAU T	
ONE METROPOLITAN SQUARE				
16TH FLOOR			ART UNIT	
ST. LOUIS, MO 63102			PAPER NUMBER	
			1639	

DATE MAILED: 11/02/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/817,821

Applicant(s)

HALL ET AL.

Examiner

MY-CHAU T. TRAN

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 21 August 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 90-122 is/are pending in the application.
- 4a) Of the above claim(s) 96,97,103-105,108-112,115,120 and 121 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 90-95,98-102,106,107,113,114,116-119 and 122 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____.

- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 08/21/2006 has been entered.

Application and Claims Status

2. Applicant's response filed 08/21/2006 are acknowledged and entered.
3. Claims 90-122 were pending. No claims were amended, added and/or cancelled. Therefore, claims 90-122 are currently pending. Claims 96, 97, 103-105, 108-112, 115, 120, and 121 are drawn to non-elected species and/or inventions and thus these claims remain withdrawn from further consideration by the examiner, 37 CFR 1.142(b), there being no allowable generic claim. Accordingly, claims 90-95, 98-102, 106, 107, 113, 114, 116-119, and 122 are under consideration in this Office Action.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person

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having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).
6. Claims 90-95, 98-102, 106, 107, 113, 114, 116-119, and 122 are rejected under 35 U.S.C. 103(a) as being unpatentable over Weinberg et al. (US Patent 6,030,917) and Johnson et al. (*J. Am. Chem. Soc.*, **1995**, 117(23), pgs. 6414-6415).

The presently claimed invention recites a method for preparing and screening an array of metal-ligand compositions. The method comprises the steps of (a) preparing an array of metal-ligand compositions in a plurality of discrete reaction vessels contained by or within an integrated structure and the preparing step comprises delivering a metal-binding ligand and a dissolved, soluble metal precursor to each of the plurality of reaction vessels of the array which combine to form the metal- ligand composition; (b) delivering a polymerization monomer to the metal-ligand compositions in the plurality of reaction vessels of the integrated structure to prepare an array of polymerization mixtures; (c) subjecting the array of polymerization mixtures in the integrated structure to conditions conducive to the formation of a polymerization reaction product; and (d) screening said array for a polymerization reaction product.

The plurality of reaction vessels of the array contains different metal-ligand compositions. The soluble metal precursor comprises a solublizing ligand and formation of one or more of the metal-ligand compositions are accompanied by the displacement of said solublizing ligand. One or more of said polymerization mixtures contains a displaced solublizing ligand resulting from the preparation of said metal- ligand compositions.

The solublizing ligand reduces the catalytic activity of the metal-ligand composition in the polymerization mixture in the polymerization reaction by less

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than about 80%. This limitation is interpreted as a functional property of the instant claimed solublizing ligand.

The applied reference has a common inventor, i.e. Johannes A. M. van Beek and Vince Murphy, with the instant application. Based upon the earlier effective U.S. filing date of the reference, it constitutes prior art only under 35 U.S.C. 102(e). This rejection under 35 U.S.C. 103(a) might be overcome by: (1) a showing under 37 CFR 1.132 that any invention disclosed but not claimed in the reference was derived from the inventor of this application and is thus not an invention "by another"; (2) a showing of a date of invention for the claimed subject matter of the application which corresponds to subject matter disclosed but not claimed in the reference, prior to the effective U.S. filing date of the reference under 37 CFR 1.131; or (3) an oath or declaration under 37 CFR 1.130 stating that the application and reference are currently owned by the same party and that the inventor named in the application is the prior inventor under 35 U.S.C. 104, together with a terminal disclaimer in accordance with 37 CFR 1.321(c). For applications filed on or after November 29, 1999, this rejection might also be overcome by showing that the subject matter of the reference and the claimed invention were, at the time the invention was made, owned by the same person or subject to an obligation of assignment to the same person. See MPEP § 706.02(l)(1) and § 706.02(l)(2).

Weinberg et al. teach the methods for the synthesis and characterization of arrays, i.e. libraries of catalysts and organometallic compounds (see e.g. Abstract; col. 1, lines 16-25; col. 3, lines 30-36). Weinberg et al. disclose a method of making an array of metal-ligand compounds wherein the step comprises reacting a metal binding ligand with a metal ion (refers to the metal precursor) (see e.g. col. 3, lines 37-54; col. 9, line 45 to col. 10, line 15). The array comprises different metal-ligand compounds at known location and the synthesis can be conducted using

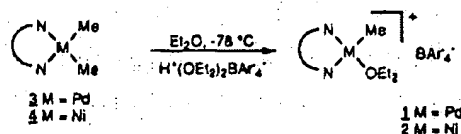
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solution-phase synthetic technique (refers to the limitation of a plurality of discrete reaction vessels contained by integrated structure and contain different metal-ligand compounds, and instant claim 92) (see e.g. col. 3, lines 55-64; col. 10, line 66 to col.11, line 12; fig. 14). The synthesis also includes adding an activator such as $\text{PhNMe}_2\text{HB}(\text{C}_6\text{F}_5)_4$ (refers to instant claims 100, 101, 113, and 114) (see e.g. col. 11, lines 28-37). The metal ion is transition metal ions (refers to instant claim 98)(see e.g. col. 11, lines 13-17; col. 24, lines 46-48). The metal-binding ligand includes ligands such as heterocyclic compounds and ancillary ligands (refers to instant claim 102) (see e.g. col. 15, line 61 to col. 16, line 11; col. 16, lines 20-34; col. 16, line 35 to col. 21, line 61). Additionally, the libraries are screened for useful property such as polymerization reaction (see e.g. col. 11, lines 38-67; col. 26, line 63 to col. 27, line 10).

The method of Weinberg et al. does not expressly include a soluble metal precursor comprising a solublizing ligand.

Johnson et al. disclose the polymerization methods using Pd(II) and Ni(II)-based catalysts that covert ethylene and α -olefins to high molar mass polymers (see e.g. pg. 6414, left col., lines 12-24; pg. 6414, Scheme 1). The transition metal is palladium and nickel (refers to instant claim 98)(see e.g. pg. 6414, left col., lines 12-24; pg. 6414, Scheme 1). Scheme 1 illustrates two distinct polymerization reactions.

As illustrated in scheme 1A, the metal-based catalyst is a methyl complex with a bulky diimine ligand that is first protonated with $\text{H}(\text{OEt}_2)_2^+\text{BAR}'_4^-$, which result in a lost of methane



and the formation of the diethyl ether adduct, i.e. , (refers

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to the instant claimed limitation of *'formation of one or more of the metal-ligand compositions is accompanied by the displacement of said solublizing ligand'*; and instant claims 99 and 107)(see e.g. pg. 6414, left col., lines 18-20). This metal-based catalyst with the ether adduct is reacted with ethylene, propylene, or 1-hexene to produce high molecular weight polymer, i.e.



(see e.g. pg. pg. 6414, left col., lines 15-24).

Moreover, two polymerization mechanisms are illustrated in the reaction (2) of page 6414, wherein the ether adduct, i.e. OEt_2 , is displaced during polymerization (refers to the instant claimed limitation of *'wherein one or more of said polymerization mixtures contains a displaced solublizing ligand resulting from the preparation of said metal- ligand compositions'*; and instant claims 99 and 107)(see e.g. pg. 6414, right col., lines 29-47). The metal-binding ligand is diimine ligands (see e.g. pg. 6414, left col., lines 15-24; pg. 6414, Scheme 1). The polymer is analyzed by NMR, i.e. nuclear magnetic resonance, (see e.g. pg. 6414, left col., lines 15-29; pg. 6414, Scheme 1; pg. 6415, Table 1).

As illustrated in scheme 1B, the metal-based catalyst is Ni, nickel, with diimine ligands and bromine groups, that is activated with an activator (refers to without displacing the solublizing ligand) and exposing the metal catalyst to ethylene (refers to a monomer) that result in a polymer, and the polymer is analyzed by NMR, i.e. nuclear magnetic resonance, (see e.g. pg. 6414, left col., line 34 thru right col., line 28; pg. 6414, Scheme 1; pg. 6415, Table 1).

Additionally, the limitation that the *'solublizing ligand reduces the catalytic activity of the metal-ligand composition in the polymerization mixture in the polymerization reaction by*

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less than about 80% is a functional limitation or a property of the claimed solublizing ligand and it is presumed to be inherent. See MPEP § 2112.01, which states that:

II. >< COMPOSITION CLAIMS — IF THE COMPOSITION IS PHYSICALLY THE SAME, IT MUST HAVE THE SAME PROPERTIES

"Products of identical chemical composition can not have mutually exclusive properties." A chemical composition and its properties are inseparable. Therefore, if the prior art teaches the identical chemical structure, the properties applicant discloses and/or claims are necessarily present. In re Spada, 911 F.2d 705, 709, 15 USPQ2d 1655, 1658 (Fed. Cir. 1990) (Applicant argued that the claimed composition was a pressure sensitive adhesive containing a tacky polymer while the product of the reference was hard and abrasion resistant. "The Board correctly found that the virtual identity of monomers and procedures sufficed to support a prima facie case of unpatentability of Spada's polymer latexes for lack of novelty.").

The ligand of Johnson et al. is the same as the claimed solublizing ligand, i.e. methyl group (an unsubstituted alkyl) and the ether adduct, i.e. OEt_2 , (alkoxy) of claims 99 and 107. Thus, the claimed functional property limitation of the solublizing ligand, i.e. *'solublizing ligand reduces the catalytic activity of the metal-ligand composition in the polymerization mixture in the polymerization reaction by less than about 80%'* and instant claim 91, is inherent to the ligand Johnson et al.

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to include a soluble metal precursor comprising a solublizing ligand as taught by Johnson et al. in the method of Weinberg et al. One of ordinary skill in the art would have been motivated to include a soluble metal precursor comprising a solublizing ligand, and the method of screening the metal-ligand composition for activity by way of polymerization reaction in the method of Weinberg et al. for the advantage of providing a catalyst system where simple variation of pressure, temperature, and ligand substituents allows access to the polymerization of ethylene and α -olefins (Johnson: pg. 6415, right col., lines 16-22). Moreover, Weinberg et al. disclose that the metal-ligand compound can be synthesized with an activating agent such as $[\text{H}(\text{OEt}_2)_2]^+[\text{BAr}_4]^-$ (Weinberg: col. 10, lines 5-10), and Johnson et al. teach using

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$[\text{H}(\text{OEt}_2)_2]^+[\text{BAR}_4]^-$ to make the Pd(II) and Ni(II)-based catalysts (Johnson: pg. 6414, left col., lines 18-20), i.e. both disclose the same reaction scheme. Furthermore, one of ordinary skill in the art would have reasonably expectation of success in the combination of Weinberg et al. and Johnson et al. because Johnson et al. shown the successful polymerization of ethylene using the soluble metal catalyst.

Therefore, the combine teachings of Weinberg et al. and Johnson et al. do render the method of the instant claims *prima facie* obvious.

Response to Arguments

7. Applicant's arguments directed to the above 103 rejection were considered but they are not persuasive for the following reasons. Please note that the above rejection has been modified from its original version to more clearly address applicant's newly amended and/or added claims and/or arguments.

[1] Applicant contends that neither the method of Weinberg et al. nor the method of Johnson et al. teach or suggest (a) "*a metal-ligand composition is formed by means of combining a dissolved soluble metal precursor and a metal binding ligand, wherein a solublizing ligand is displaced*", and (b) "*a polymerization is carried out in the presence of a displaced solublizing ligand*".

[2] Applicant alleges that neither the method of Weinberg et al. nor the method of Johnson et al. teach or suggest that "*the displaced solublizing ligand reduces the catalytic activity of the metal-ligand composition in the polymerization mixture, in a polymerization screening reaction, by less than 80%*".

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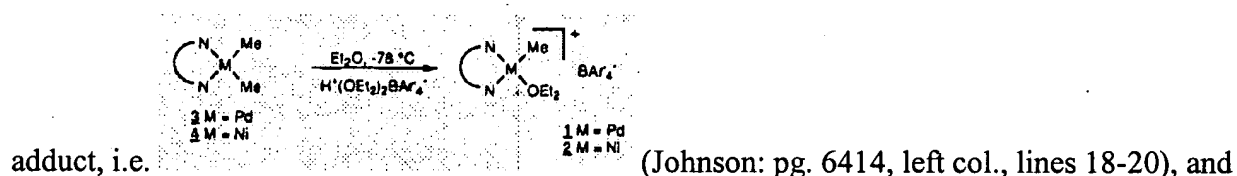
[3] Applicant argues that there is no motivation to combine the references of Weinberg et al. and Johnson et al.

Thus, the combine teachings of Weinberg et al. and Johnson et al. do not render the method of the instant claims *prima facie* obvious.

This is not found persuasive for the following reasons:

[1] The examiner respectfully disagrees. It is the examiner's position that the combine teachings of Weinberg et al. and Johnson et al. do render the method of the instant claims *prima facie* obvious because the method of Johnson et al. do teach (a) "a metal-ligand composition is formed by means of combining a dissolved soluble metal precursor and a metal binding ligand, wherein a solublizing ligand is displaced", and (b) "a polymerization is carried out in the presence of a displaced solublizing ligand".

For (a), Johnson et al. illustrated in Scheme 1A that the metal-based catalyst is a methyl complex with a bulky diimine ligand that is first protonated with $\text{H}(\text{OEt}_2)_2^+\text{BAR}'_4^-$, which result in a lost of methane, i.e. displacing the solublizing ligand, and the formation of the diethyl ether



in the supplementary material on page 2, lines 44-47, Johnson et al. teach that the reaction occurs in "solution", which suggest that the metal precursor is a "dissolved soluble metal precursor".

Consequently, Johnson et al. do teach the limitation of "a metal-ligand composition is formed by means of combining a dissolved soluble metal precursor and a metal binding ligand, wherein a solublizing ligand is displaced". Although the method of Johnson et al. teaches the additional step of purification of the "metal-ligand composition", the "comprising" language of the claim

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does not exclude additional method step such as the step of purification of the “*metal-ligand composition*” of Johnson et al. See MPEP § 2111.03, which states that:

The transitional term “comprising”, which is synonymous with “including,” “containing,” or “characterized by,” is inclusive or open-ended and does not exclude additional, unrecited elements or method steps. See, e.g., *Mars Inc. v. H.J. Heinz Co.*, 377 F.3d 1369, 1376, 71 USPQ2d 1837, 1843 (Fed. Cir. 2004).

For (b), Johnson et al. illustrated in the reaction (2) of page 6414 the polymerization mechanism wherein the ether adduct, i.e. OEt_2 , is displaced during polymerization, and as a result Johnson et al. do teach the limitation of “*a polymerization is carried out in the presence of a displaced solublizing ligand*”.

[2] The examiner respectfully disagrees. It is the examiner’s position that although neither the method of Weinberg et al. nor the method of Johnson et al. teach or suggest that “*the displaced solublizing ligand reduces the catalytic activity of the metal-ligand composition in the polymerization mixture, in a polymerization screening reaction, by less than 80%*” this limitation is a functional limitation or a property of the claimed solublizing ligand and it is presumed to be inherent. See MPEP § 2112.01. The ligand of Johnson et al. is the same as the claimed solublizing ligand, i.e. methyl group (an unsubstituted alkyl) and the ether adduct, i.e. OEt_2 , (alkoxy) of claims 99 and 107. Thus, the claimed functional property limitation of the solublizing ligand, i.e. ‘*solublizing ligand reduces the catalytic activity of the metal-ligand composition in the polymerization mixture in the polymerization reaction by less than about 80%*’ and instant claim 91, is inherent to the ligand Johnson et al. Moreover, objective evidence, i.e. applicant’s arguments that the ‘*present process is therefore advantageous in that...the displaced solublizing ligand is sufficiently innocuous such that it reduces the catalytic activity of the metal-ligand composition in the polymerization reaction of interest by less than 80%*’, which

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must be factually supported by an appropriate affidavit or declaration to be of probative value, includes evidence of unexpected results... See, for example, *In re De Blauwe*, 736 F.2d 699, 705, 222 USPQ 191, 196 (Fed. Cir. 1984) ("It is well settled that unexpected results must be established by factual evidence"). Lastly, any differences between the claimed invention and the prior art may be expected to result in some differences in properties. The issue is whether the properties differ to such an extent that the difference is really unexpected. *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986)(see MPEP § 716.02).

[3] The examiner respectfully disagrees. In response to applicant's argument that there is no suggestion to combine the references, the examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988), and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). In this case, there is a suggestion to combine the teaching of Weinberg et al. and Johnson et al. in that solution base methodologies for the synthesis of olefins are known in the art and since both Weinberg et al. and Johnson et al. disclose the method of making diimine Ni and Pd complexes the type of solution base methodologies use in the method of Weinberg et al. would be a choice of experimental design and is considered within the purview of the cited prior art. Moreover, Weinberg et al. disclose that any the solution base methodologies for the synthesis of olefins can be use in the combinatorial method of synthesis (Weinberg: col. 38, lines 25-61) it would have been obvious to a person of ordinary skill in the art at the time the invention was made to include a soluble metal precursor comprising a

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solublizing ligand, and the method of screening the metal-ligand composition for activity by way of polymerization reaction as taught by Johnson et al. in the method of Weinberg et al. In addition, the motivation to combine the teaching of Weinberg et al. and Johnson et al. is also found in the teaching of Johnson et al., i.e. the advantage of providing a catalyst system where simple variation of pressure, temperature, and ligand substituents allows access to the polymerization of ethylene and α -olefins (Johnson: pg. 6415, right col., lines 16-22). Thus, there is a motivation to combine the teaching of Weinberg et al. and Johnson et al.

Therefore, the combine teachings of Weinberg et al. and Johnson et al. do render the method of the instant claims *prima facie* obvious, and the rejection is maintained.

8. Claim 122 is rejected under 35 U.S.C. 103(a) as being unpatentable over Weinberg et al. (US Patent 6,030,917) and Johnson et al. (*J. Am. Chem. Soc.*, 1995, 117(23), pgs. 6414-6415) as applied to claims 90-95, 98-102, 106, 107, 113, 114, and 116-119 above, and further in view of Murata et al. (US Patent 5,892,075).

The method combination of Weinberg et al. and Johnson et al. disclose the method of making and screening an array of metal-ligand compositions.

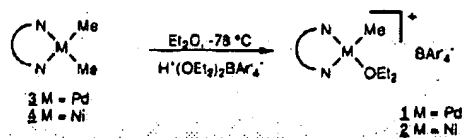
Weinberg et al. teach the methods for the synthesis and characterization of arrays, i.e. libraries of catalysts and organometallic compounds (see e.g. Abstract; col. 1, lines 16-25; col. 3, lines 30-36). Weinberg et al. disclose a method of making an array of metal-ligand compounds wherein the step comprises reacting a metal binding ligand with a metal ion (refers to the metal precursor) (see e.g. col. 3, lines 37-54; col. 9, line 45 to col. 10, line 15). The array comprises different metal-ligand compounds at known location and the synthesis can be conducted using

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solution-phase synthetic technique (refers to the limitation of a plurality of discrete reaction vessels contained by integrated structure and contain different metal-ligand compounds, and instant claim 92) (see e.g. col. 3, lines 55-64; col. 10, line 66 to col. 11, line 12; fig. 14). The synthesis also includes adding an activator such as $\text{PhNMe}_2\text{HB}(\text{C}_6\text{F}_5)_4$ (refers to instant claims 100, 101, 113, and 114) (see e.g. col. 11, lines 28-37). The metal ion is transition metal ions (refers to instant claim 98) (see e.g. col. 11, lines 13-17; col. 24, lines 46-48). The metal-binding ligand includes ligands such as heterocyclic compounds and ancillary ligands (refers to instant claim 102) (see e.g. col. 15, line 61 to col. 16, line 11; col. 16, lines 20-34; col. 16, line 35 to col. 21, line 61). Additionally, the libraries are screened for useful property such as polymerization reaction (see e.g. col. 11, lines 38-67; col. 26, line 63 to col. 27, line 10).

Johnson et al. disclose the polymerization methods using Pd(II) and Ni(II)-based catalysts that convert ethylene and α -olefins to high molar mass polymers (see e.g. pg. 6414, left col., lines 12-24; pg. 6414, Scheme 1). The transition metal is palladium and nickel (refers to instant claim 98) (see e.g. pg. 6414, left col., lines 12-24; pg. 6414, Scheme 1). Scheme 1 illustrates two distinct polymerization reactions.

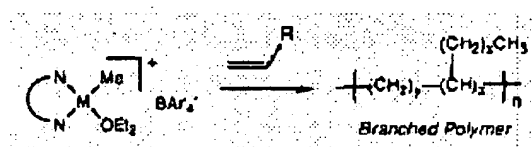
As illustrated in scheme 1A, the metal-based catalyst is a methyl complex with a bulky diimine ligand that is first protonated with $\text{H}(\text{OEt}_2)_2^+\text{BAR}'_4^-$, which result in a loss of methane



and the formation of the diethyl ether adduct, i.e. (refers to the instant claimed limitation of 'formation of one or more of the metal-ligand compositions is accompanied by the displacement of said solubilizing ligand'; and instant claims 99 and 107) (see

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e.g. pg. 6414, left col., lines 18-20). This metal-based catalyst with the ether adduct is reacted with ethylene, propylene, or 1-hexene to produce high molecular weight polymer, i.e.



(see e.g. pg. pg. 6414, left col., lines 15-24).

Moreover, two polymerization mechanisms are illustrated in the reaction (2) of page 6414, wherein the ether adduct, i.e. OEt_2 , is displaced during polymerization (refers to the instant claimed limitation of *'wherein one or more of said polymerization mixtures contains a displaced solublizing ligand resulting from the preparation of said metal- ligand compositions'*; and instant claims 99 and 107)(see e.g. pg. 6414, right col., lines 29-47). The metal-binding ligand is diimine ligands (see e.g. pg. 6414, left col., lines 15-24; pg. 6414, Scheme 1). The polymer is analyzed by NMR, i.e. nuclear magnetic resonance, (see e.g. pg. 6414, left col., lines 15-29; pg. 6414, Scheme 1; pg. 6415, Table 1).

As illustrated in scheme 1B, the metal-based catalyst is Ni, nickel, with diimine ligands and bromine groups, that is activated with an activator (refers to without displacing the solublizing ligand) and exposing the metal catalyst to ethylene (refers to a monomer) that result in a polymer, and the polymer is analyzed by NMR, i.e. nuclear magnetic resonance, (see e.g. pg. 6414, left col., line 34 thru right col., line 28; pg. 6414, Scheme 1; pg. 6415, Table 1).

Additionally, the limitation that the *'solublizing ligand reduces the catalytic activity of the metal-ligand composition in the polymerization mixture in the polymerization reaction by less than about 80%'* is a functional limitation or a property of the claimed solublizing ligand and it is presumed to be inherent. See MPEP § 2112.01, which states that:

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II. >< COMPOSITION CLAIMS — IF THE COMPOSITION IS PHYSICALLY THE SAME, IT MUST HAVE THE SAME PROPERTIES

"Products of identical chemical composition can not have mutually exclusive properties." A chemical composition and its properties are inseparable. Therefore, if the prior art teaches the identical chemical structure, the properties applicant discloses and/or claims are necessarily present. In re Spada, 911 F.2d 705, 709, 15 USPQ2d 1655, 1658 (Fed. Cir. 1990) (Applicant argued that the claimed composition was a pressure sensitive adhesive containing a tacky polymer while the product of the reference was hard and abrasion resistant. "The Board correctly found that the virtual identity of monomers and procedures sufficed to support a prima facie case of unpatentability of Spada's polymer latexes for lack of novelty.").

The ligand of Johnson et al. is the same as the claimed solublizing ligand, i.e. methyl group (an unsubstituted alkyl) and the ether adduct, i.e. OEt₂, (alkoxy) of claims 99 and 107.

Thus, the claimed functional property limitation of the solublizing ligand, i.e. *'solublizing ligand reduces the catalytic activity of the metal-ligand composition in the polymerization mixture in the polymerization reaction by less than about 80%'* and instant claim 91, is inherent to the ligand Johnson et al.

The method combination of Weinberg et al. and Johnson et al. disclose the method of making and screening an array of metal-ligand compositions. However, neither Weinberg et al. nor Johnson et al. expressly include the addition of a deprotonating agent in the method of synthesizing the metal ligand compound and the deprotonating agent is BuLi.

Murata et al. disclose a process for synthesizing metallocene compounds (see e.g. Abstract; col. 3, lines 7-14). The metal includes Hf(IV) (see e.g. col. 10, lines 23-38). The synthetic method of the metal compound comprise of the addition of the deprotonating agent, which is n-BuLi (see e.g. col. 11, lines 31-40).

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to include the addition of a deprotonating agent in the method of synthesizing the metal ligand compound and the deprotonating agent is BuLi as taught by Murata et al. in the method combination of Weinberg et al. and Johnson et al. One of ordinary skill in

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the art would have been motivated to include the addition of a deprotonating agent in the method of synthesizing the metal ligand compound and the deprotonating agent is BuLi in the method combination of Weinberg et al. and Johnson et al. for the advantage of providing an efficient synthesis of metallocene compounds (Murata: col. 5, lines 48-56). Furthermore, one of ordinary skill in the art would have reasonably expectation of success in the combination of Weinberg et al., Johnson et al., and Murata et al. because Murata et al. disclose by examples the synthesis of metallocene compounds with the addition of the deprotonating agent (see e.g. col. 12, line 35 to col. 21, line 49).

Response to Arguments

9. Applicant's arguments directed to the above 103 rejection were considered but they are not persuasive for the following reasons. Please note that the above rejection has been modified from its original version to more clearly address applicant's newly amended and/or added claims and/or arguments.

[1] Applicant contends that the methods of Weinberg et al., Johnson et al., and Murata et al. do not teach or suggest (a) *"a metal-ligand composition is formed by means of combining a dissolved soluble metal precursor and a metal binding ligand, wherein a solublizing ligand is displaced"*, and (b) *"a polymerization is carried out in the presence of a displaced solublizing ligand"*.

[2] Applicant alleges that the methods of Weinberg et al., Johnson et al., and Murata et al. do not teach or suggest that *"the displaced solublizing ligand reduces the catalytic activity of the metal-ligand composition in the polymerization mixture, in a polymerization screening reaction, by less than 80%"*.

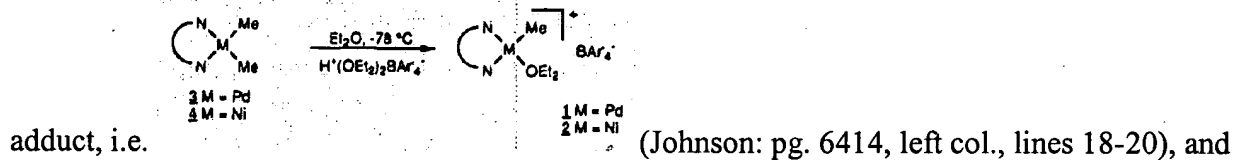
[3] Applicant argues that there is no motivation to combine the references of Weinberg et al., Johnson et al., and Murata et al.

Thus, the combine teachings of Weinberg et al., Johnson et al., and Murata et al. do not render the method of the instant claims *prima facie* obvious.

This is not found persuasive for the following reasons:

[1] The examiner respectfully disagrees. It is the examiner's position that the combine teachings of Weinberg et al., Johnson et al., and Murata et al. do render the method of the instant claims *prima facie* obvious because the method of Johnson et al. do teach (a) "*a metal-ligand composition is formed by means of combining a dissolved soluble metal precursor and a metal binding ligand, wherein a solublizing ligand is displaced*", and (b) "*a polymerization is carried out in the presence of a displaced solublizing ligand*".

For (a), Johnson et al. illustrated in Scheme 1A that the metal-based catalyst is a methyl complex with a bulky diimine ligand that is first protonated with $\text{H}(\text{OEt}_2)_2^+\text{BAR}'_4^-$, which result in a lost of methane, i.e. displacing the solublizing ligand, and the formation of the diethyl ether



in the supplementary material on page 2, lines 44-47, Johnson et al. teach that the reaction occurs in "solution", which suggest that the metal precursor is a "*dissolved soluble metal precursor*".

Consequently, Johnson et al. do teach the limitation of "*a metal-ligand composition is formed by means of combining a dissolved soluble metal precursor and a metal binding ligand, wherein a solublizing ligand is displaced*". Although the method of Johnson et al. teaches the additional step of purification of the "*metal-ligand composition*", the "*comprising*" language of the claim

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does not exclude additional method step such as the step of purification of the “*metal-ligand composition*” of Johnson et al. See MPEP § 2111.03, which states that:

The transitional term “comprising”, which is synonymous with “including,” “containing,” or “characterized by,” is inclusive or open-ended and does not exclude additional, unrecited elements or method steps. See, e.g., *Mars Inc. v. H.J. Heinz Co.*, 377 F.3d 1369, 1376, 71 USPQ2d 1837, 1843 (Fed. Cir. 2004).

For (b), Johnson et al. illustrated in the reaction (2) of page 6414 the polymerization mechanism wherein the ether adduct, i.e. OEt_2 , is displaced during polymerization, and as a result Johnson et al. do teach the limitation of “*a polymerization is carried out in the presence of a displaced solublizing ligand*”.

[2] The examiner respectfully disagrees. It is the examiner’s position that although the methods of Weinberg et al., Johnson et al., and Murata et al. do not teach or suggest that “*the displaced solublizing ligand reduces the catalytic activity of the metal-ligand composition in the polymerization mixture, in a polymerization screening reaction, by less than 80%*” this limitation is a functional limitation or a property of the claimed solublizing ligand and it is presumed to be inherent. See MPEP § 2112.01. The ligand of Johnson et al. is the same as the claimed solublizing ligand, i.e. methyl group (an unsubstituted alkyl) and the ether adduct, i.e. OEt_2 , (alkoxy) of claims 99 and 107. Thus, the claimed functional property limitation of the solublizing ligand, i.e. ‘*solublizing ligand reduces the catalytic activity of the metal-ligand composition in the polymerization mixture in the polymerization reaction by less than about 80%*’ and instant claim 91, is inherent to the ligand Johnson et al. Moreover, objective evidence, i.e. applicant’s arguments that the ‘*present process is therefore advantageous in that...the displaced solublizing ligand is sufficiently innocuous such that it reduces the catalytic activity of the metal-ligand composition in the polymerization reaction of interest by less than 80%*’, which

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must be factually supported by an appropriate affidavit or declaration to be of probative value, includes evidence of unexpected results... See, for example, *In re De Blauwe*, 736 F.2d 699, 705, 222 USPQ 191, 196 (Fed. Cir. 1984) ("It is well settled that unexpected results must be established by factual evidence"). Lastly, any differences between the claimed invention and the prior art may be expected to result in some differences in properties. The issue is whether the properties differ to such an extent that the difference is really unexpected. *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986)(see MPEP § 716.02).

[3] The examiner respectfully disagrees. In response to applicant's argument that there is no suggestion to combine the references, the examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988), and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). In this case, the motivation to combine the teaching of Weinberg et al., Johnson et al., and Murata et al. is also found in the teaching of Murata et al., i.e. the advantage of providing an efficient synthesis of metallocene compounds (Murata: col. 5, lines 48-56). Thus, there is a motivation to combine the teaching of Weinberg et al., Johnson et al., and Murata et al.

Therefore, the combine teachings of Weinberg et al., Johnson et al., and Murata et al. do render the method of the instant claims *prima facie* obvious, and the rejection is maintained.

Conclusion

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Any inquiry concerning this communication or earlier communications from the examiner should be directed to My-Chau T. Tran whose telephone number is 571-272-0810.

The examiner can normally be reached on Monday: 8:00-2:30; Tuesday-Thursday: 7:30-5:00; Friday: 8:00-3:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Peter Paras, Jr., can be reached on 571-272-4517. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

My-Chau T. Tran
October 29, 2006

 10/29/06
MY-CHAU T. TRAN
PATENT EXAMINER